IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Albert John DZERMEJKO et al.

OFFICIAL

Serial No.: 10/070,738 Examiner: Scott R. Kastler

Filed: August 16, 2002 Art Unit: 1742

For: COOLING PANEL FOR A SHAFT FURNACE, SHAFT FURNACE PROVIDED WITH COOLING PANELS OF THIS NATURE, AND A PROCESS FOR PRODUCING SUCH A COOLING PANEL

REQUEST FOR RECONSIDERATION

Commissioner for Patents
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ok to enter

Sir:

In response to the Final Office Action of April 20, 2004, the period for response being extended by the concurrently filed petition and fee therefore, Applicants respectfully request reconsideration.

I. Hille et al. in view of McRae

Initially, Applicants thank the Examiner for withdrawing the rejection of claims 1-16 under 35 USC § 103(a) as allegedly being unpatentable over Hille et al. (U.S. Patent No. 5,678,806) in view of MacRae (U.S. Patent No. 6,820,681), as MacRae is not a proper reference under 35 USC § 102.

II. Hille et al. in view of McKoon

Claims 1-16 stand rejected under 35 USC § 103(a) as allegedly being unpatentable over Hille et al. (US 5,678,806) in view of McKoon (the article entitled "A Comparison of the Heat Transfer Capabilities of Two Manufacturing Methods for High Heat Flux Water Cooled Devices"). The Office Action asserts Hille et al. teaches each feature of the claims, except for (1) the ribs being employed on cooling plates made by casting copper around steel cooling tubes,

(2) specific rib dimensions or (3) the use of Monel as the tube material. However, the Office action continues, such features would have been obvious to one of ordinary skill in the art at the time the invention was made, or is taught by McKoon. Applicants respectfully request reconsideration.

A. Hille et al.

It is respectfully submitted the Office action is improperly combining two parts of Hille et al. which effectively constitute two separate non-combinable references.

The first part is the Background of the Invention that discloses prior art plate coolers made of copper casting in which the channels are formed either by cast-in steel tubes or are cast in directly (Col. 1, lines 25-27). The second part is the description of Hille et al.'s invention, namely structures of the cooling plates of Hille et al disclosed for the actual embodiments of the invention of Hille et al.

The Office action asserts it would be obvious to modify the cast copper plate of the prior art (discussed in the first part of Hille et al.) to have the ribbed structure of the embodiments of the Hille et al. invention (discussed in the second part of Hille et al.) because it would be desirable to improve protection of such cast copper plates in which the channels are formed either by cast-in steel tubes or are cast in directly. This is improper because Hille et al teaches away from making its ribbed structures with copper casting.

Hille et al. in its Background of the Invention states, "Plates made of a copper casting, in which the cooling channels are formed either in cast-in steel tubes or are cast in directly, have been known." (Hille et al., col. 1, lines 25-27). Hille et al. then immediately teaches away from utilizing a copper cast product in the cooling panel by stating.

> "The structure of a copper casting is not as homogeneous and dense as that of forged or rolled copper. The thermal conduction of a copper casting is consequently also poorer and its strength is lower. An oxide film between the tube and the copper ingot hinders thermal conduction in cast-in tubes."

(Hille et al., Col. 1, lines 27-33).

In fact, Hille et al. teaches to employ plate coolers having copper or a low-alloy copper alloy with cooling channels arranged in their interior, wherein the plate coolers are made of a

forged or rough rolled ingot to avoid the problems with cast copper materials (Hille et al., Col. 2, lines 24-27).

Hille et al teaches away from using plate coolers, made of copper casting in which the channels are formed either by cast-in steel tubes or are cast in directly. Thus, it would not be obvious to replace "forged or rough rolled ingot" provided with drilled holes of the actual embodiments of the Hille et al invention (see Col. 2, lines 27-28) with copper casting in which the channels are formed either by cast-in steel tubes or are cast in directly. See *MPEP*, Sections 2141.02, 2145 (Rev. 2, May 2004).

Moreover, Hille et al fails to teach how to employ cast copper around the cooling tubes without the above-described disadvantages. Hille et al. teaches a copper or low-alloy copper alloy forged or rough rolled ingot for use in the plate cooler. There is no discussion of any type of casting the alloy which defines webs 9 and grooves 10 (Fig. 5).

B. McKoon does not make up for the deficiencies of Hille et al.

Present claim 1 describes two different materials for the tube and outer casting. The tubes is "an alloy which predominantly comprises Cu and Ni with a Ni content of $\geq 28\%$ by weight" for the tube. The casting consists of copper. The specification at page 4 defines copper as "meaning not only completely pure copper but also low alloy with a composition such as that which is customarily used for the production of copper cooling panels." Hille et al fails to disclose this and McKoon does not make up for this deficiency.

McKoon discloses tests relating to coolers for electron beam processing apparatus, not shaft furnaces. McKoon relates to a different field than does Hittle et al and even points away from the present invention. McKoon experimented with a cast in Monel tube and came to the conclusion (page 49) that the cooling performance of a cooling body having a Monel tube cast in copper is much less than the cooling performance of a similar body made of forged copper having drilled passages and "this technology [is] of limited value for most electron beam melting and refining applications" (page 49). It is noted that McKoon was published in 1986. In spite of long felt need for improved cooling plates, even by 1996 Hille et al still did not suggest using cooling panels having cast in Monel tubes. The cited references neither separately nor combined teach or suggest the unexpected advantages described in the present application for the cooling

panel of the present invention. The present application at page 2, last paragraph, mentions an unexpected advantage that the copper/nickel alloy can be used to produce high quality tubes which avoid leakage even if the cast copper body begins to exhibit pores or cracks.

The Office action assumes a benefit of higher melting point for Monel would be desired in spite of the fact that McKoon page 49 expressly teaches the disadvantages of using Monel. Applicant does not agree that such a higher melting point motivation is necessarily controlling. Any cast in pipe would have a melting point high enough to be a cast in pipe. Thus, it is respectfully submitted the Office action fails to consider the reference as a whole.

Thus, it is respectfully submitted it is only with hindsight that the Office action has been able to piece together these three separate conflicting teachings to arrive at the present invention.

III. Conclusion

In view of the above, it is respectfully submitted that all rejections are overcome. Thus, a Notice of Allowance is respectfully requested.

Respectfully submitted,

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Date: August 19, 2004 By: Anthony P. Venturino

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